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**REMARKS**

The following remarks are responsive to the November 4, 2004 Office Action. Claims 1-17 remain as originally filed, and Claims 18-25 were previously cancelled without prejudice. Thus, Claims 1-17 are presented for further consideration. Please reconsider the claims in view of the following remarks.

**Written Statement of Substance of Personal Interview on February 9, 2005**

Applicant thanks the Examiner for the courtesy of conducting a personal interview on February 9, 2005 with Applicant, Dr. Bogdan C. Maglich, and Applicant's representative, Bruce S. Itchkawitz. With regard to the present application, the rejections at hand were discussed. The Examiner agreed to withdraw the objections/rejections to the specification and Claims 1-17 under 35 U.S.C. § 112, first paragraph and second paragraph with regard to the vacuum. The Examiner also stated that he would consider the arguments to be submitted by Applicant with regard to the other rejections.

**Response to Provisional Rejection of Claims 1-17 for Obviousness-Type Double Patenting**

In the November 4, 2004 Office Action, the Examiner states that the Terminal Disclaimer filed with the previous "Response to May 28, 2004 Office Action" references the wrong application number "09/778,736" instead of the correct application number "09/788,736." Applicant thanks the Examiner for pointing out this typographical error.

The provisional rejection of Claims 1-17 of the present application as not being patentably distinct from Claims 1, 7, and 9-18 of co-pending U.S. Application No. 09/788,736 under the judicially-created doctrine of obviousness-type double patenting was originally stated by the Examiner in the May 28, 2003 Office Action. Applicant continues to traverse this provisional rejection of Claims 1-17, as originally set forth in Applicant's "Amendment and Response to May 28, 2003 Office Action." However, in the pursuit of an expedited allowance of the claims, Applicant has enclosed herewith a Terminal Disclaimer in compliance with 37 C.F.R. § 1.321(c) to overcome this provisional rejection. Applicant respectfully request that the Examiner withdraw the rejection of Claims 1-17 and pass Claims 1-17 to allowance.

**Response to Objection to the Specification and Rejection of Claims 1-17 Under 35 U.S.C. § 112, First Paragraph and Second Paragraph Regarding the Vacuum**

In the November 4, 2004 Office Action, the Examiner objects to the specification and rejects Claims 1-17 under 35 U.S.C. § 112, first paragraph as failing to provide an adequate

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written description of the present invention and as failing to provide an enabling disclosure with regard to the vacuum or pressure between the alpha particle detector array and the target. The Examiner also rejects Claims 1-17 under 35 U.S.C. § 112, second paragraph as being incomplete for omitting essential elements regarding the vacuum or pressure between the alpha particle detector array and the target.

As discussed above, in the February 9, 2005 personal interview, the Examiner has withdrawn the objection to the specification and the rejection of Claims 1-17 with regard to the vacuum or pressure.

**Response to Objection to the Specification and Rejection of Claims 1-17 Under 35 U.S.C. § 112, First Paragraph Regarding the Ranges of the First and Second Distances**

In the November 4, 2004 Office Action, the Examiner states that Applicant's arguments set forth in Applicant's "Response to May 28, 2004 Office Action" are unpersuasive regarding the adequacy of the specification to satisfy the written description and enablement requirements of 35 U.S.C. § 112, first paragraph. The Examiner restates the assertion that the specification fail to provide adequate written description or enabling disclosure by not providing a range of values for the distance between the target and the material under study and the distance between the target and alpha particle detector array. The Examiner restates that the claim language is broader than the enabling disclosure as no range of values is set forth.

Applicant respectfully disagrees with the Examiner, and incorporates herein by reference the arguments originally presented in Applicant's "Response to May 28, 2004 Office Action" in their entirety. Applicant also supplements these arguments as discussed below.

Pursuant to M.P.E.P. § 2164.01, enablement is satisfied where the specification provides sufficient disclosure for persons skilled in the art to practice the claimed invention without undue experimentation. The present specification provides a specific example of the distances in a specific operative embodiment (see, e.g., Figure 18 and page 25, lines 1-22) and provides an equation to calculate other distances (see, e.g., page 24, lines 28-30). Given this information and the remaining portions of the present specification, persons skilled in the art do not have to conduct undue experimentation to practice the claimed invention. It is a simple matter of geometry.

The Examiner states that since the specification does not provide minimum or maximum values, a distance of infinity between the alpha particle detector array and the target would appear

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to provide maximum magnification but would be inoperable by not providing any counts, so the skilled artisan must use undue experimentation to practice the claimed invention. However, Applicant submits that merely having claim language which includes inoperative embodiments does not mean that the claim is not enabled. As explained by M.P.E.P. § 2164.08:

Claims are not rejected as broader than the enabling disclosure under 35 U.S.C. 112 for noninclusion of limitations dealing with factors which must be presumed to be within the level of ordinary skill in the art; the claims need not recite such factors where one of ordinary skill in the art to whom the specification and claims are directed would consider them obvious.

Pursuant to M.P.E.P. § 2164.08(b), the standard is whether undue experimentation is needed to determine which embodiments are enabled or not enabled. Applicant submits that persons skilled in the art would readily know that it is impossible to place the alpha particle detector array infinitely far from the target, as well as that such a configuration would be inoperative. Pursuant to M.P.E.P. § 2164.06, the present specification provides sufficient direction or guidance for skilled artisans to practice the full scope of the claims as taught by the specification without resorting to undue experimentation.

Furthermore, the standard stated on page 5 of the November 4, 2004 Office Action that “the claims are broader than the enabling disclosure” is not the proper test for enablement. Claims are almost always broader than the disclosed embodiments since, as described by M.P.E.P. § 2164.08, limitations and examples in the specification do not generally limit what is covered by the claims. For example, a single species can adequately support a generic claim (see, e.g., M.P.E.P. § 2163.05 and Bilstad v. Wakalopolos, 72 U.S.P.Q.2d 1785 (Fed. Cir. 2004)). Pursuant to M.P.E.P. § 2164.08, the test is whether the scope of enablement is commensurate with the scope of the claims. In the present specification, the specific operable embodiment and the equation cited above provide all the species of the genus. Therefore, the present specification and Claims 1-17 satisfy the enablement requirement of 35 U.S.C. § 112, first paragraph.

Pursuant to M.P.E.P. § 2164.04, the Examiner has the initial burden to establish a reasonable basis to question the enablement. The Examiner must give reasons for the uncertainty and “specific technical reasons are always required” (M.P.E.P. § 2164.04). Because the Examiner has not provided specific technical reasons as to why persons skilled in the art can not utilize the specific operable embodiment and the equation disclosed in the present specification

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to practice the claimed invention, Applicant respectfully submits that the Examiner has not satisfied this burden. Therefore, the present specification and Claims 1-17 satisfy the enablement requirement of 35 U.S.C. § 112, first paragraph.

**Response to Rejection of Claims 5-12 and 14-17 Under 35 U.S.C. § 103(a)**

In the November 4, 2004 Office Action, the Examiner rejects Claims 5-12 and 14-17 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,076,993 issued to Sawa et al. ("Sawa"). The Examiner states that Sawa discloses all the limitations of Claims 5-12 and 14-17, except for the claimed relationship between the first distance and the second distance. The Examiner cites M.P.E.P. § 2144.04(IV)(A) for the proposition that the claimed device of Claims 5-12 and 14-17 is not patentably distinct from the prior art, stating that the only difference between the prior art and the claimed invention is a recitation of relative dimensions of the claimed device, and that a device having the claimed relative dimensions would not perform differently than the prior art device. The Examiner also cites M.P.E.P. § 2144.05(II)(A and B) for the proposition that Claims 5-12 and 14-17 fall within the optimization of ranges.

**Claim 5**

Claim 5 recites (emphasis added):

5. A system for detecting and imaging a chemical substance, comprising:

a particle source, the source generating a plurality of first subatomic particles and a plurality of second subatomic particles from a target position a first distance from the chemical substance, the first subatomic particles irradiating the chemical substance;

at least one photon detector capable of detecting photons resulting from the irradiation of the chemical substance by the first subatomic particles;

**a particle detector array comprising a plurality of particle detectors,** the particle detector array capable of detecting at least one second subatomic particle, **the particle detector array at a second distance from the target position, the second distance larger than the first distance;** and

an analyzer capable of detecting and imaging the chemical substance based on signals output from the at least one photon detector and the at least one particle detector.

Applicant submits that Sawa does not disclose all the limitations of Claim 5. In particular, Sawa does not disclose or suggest a system having "a particle detector array comprising a plurality of particle detectors," as recited by Claim 5. Furthermore, Sawa does not disclose or suggest a system having "a target position a first distance from the chemical substance" combined with "the particle detector array at a second distance from the target position, the second distance

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larger than the first distance,” as recited by Claim 5. Claim 5 recites a system having a new structure which performs differently (e.g., provides magnification) than does the prior art. Therefore, Claim 5 is patentably distinguished over Sawa.

In addition, Applicant respectfully submits that the concept of relative dimensions is not applicable to reject Claim 5 of the present application. M.P.E.P. § 2144.04(IV)(A), entitled “Changes in Size/Proportion,” addresses situations where the claimed invention can be obtained by merely scaling the dimensions of the prior art system either up or down. The structure recited by Claim 5 can not be obtained by merely scaling the structure disclosed by Sawa either up or down. For whatever scale is used, the system of Sawa never satisfies the limitation that the second distance (between the particle detector and the target position) is larger than the first distance (between the target position and the chemical substance). Therefore, the claimed invention of Claim 5 is not merely different from the system disclosed by Sawa by a recitation of relative dimensions.

Furthermore, Applicant respectfully submits that the concept of optimization of ranges of M.P.E.P. § 2144.05(II)(A and B) is not applicable to reject Claim 5 of the present application. Pursuant to M.P.E.P. § 2144.05(II)(A), it is not patentable to discover the optimum or workable range by routine experimentation where the general conditions of the claim are disclosed in the prior art. However, the general condition of Claim 5 (e.g., the second distance is larger than the first distance) is not disclosed by the prior art, so the structure of Claim 5 can not be a mere discovery of the optimum or workable range by routine experimentation. Also, pursuant to M.P.E.P. § 2144.05(II)(B), the parameter being optimized must be recognized by the prior art as a result-effective variable before its determination might be characterized as routine experimentation. The prior art does not recognize that the ratio of the first distance to the second distance is a result-effective variable, so the claimed invention of Claim 5 can not be the result of mere optimization by routine experimentation.

Therefore, Applicant submits that Claim 5 is patentably distinguished over Sawa. Applicant respectfully requests that the Examiner withdraw the rejection of Claim 5 and pass Claim 5 to allowance.

Claims 6-12 and 14-17

Each of Claims 6, 7, 10, 12, and 14 depends from Claim 5, each of Claims 8 and 9 depends from Claim 7, Claim 11 depends from Claim 10, each of Claims 15 and 16 depends

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from Claim 14, and Claim 17 depends from Claim 16. Therefore, each of Claims 6-12 and 14-17 includes all the limitations of Claim 5, as well as other limitations of particular utility. For the reasons previously stated with regard to Claim 5, Applicant submits that Claims 6-12 and 14-17 are patentably distinguished over Sawa, and Applicant respectfully requests that the Examiner withdraw the rejection of Claims 6-12 and 14-17 and pass these claims to allowance.

#### **Response to Rejection of Claims 1-4 and 13 Under 35 U.S.C. § 103(a)**

In the November 4, 2004 Office Action, the Examiner rejects Claims 1-4 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Sawa in view of the “admitted prior art.”

Regarding the Examiner’s reference to “admitted prior art,” Applicant herein incorporates by reference the remarks made in the “Amendment and Response to May 28, 2003 Office Action.” In particular, Applicant asserts that while particular individual elements are known in the art, the selection, the combination, and the motivation to combine these elements as defined in the claimed invention are not taught, disclosed, or suggested by the prior art.

#### Claim 1

Claim 1 recites (emphasis added):

1. A system for non-invasive stoichiometric detection and imaging of chemical elements and compounds in a material to be analyzed, the system comprising:

a particle generator, the particle generator generating a plurality of first subatomic particles and a plurality of second subatomic particles at a **target position which is a first distance from the material to be analyzed**;

at least one photon detector, the at least one photon detector being capable of detecting photons resulting from irradiation of the material to be analyzed by the first subatomic particles and generating a plurality of first electrical signals;

**a particle detector array comprising a plurality of particle detectors, the detector array at a second distance from the target position, the second distance being larger than the first distance**, the particle detectors each being capable of detecting at least one second subatomic particle from the particle generator, and generating a plurality of second electrical signals; and

an analyzer operatively connected to the particle detector array and the at least one photon detector, comprising:

a processor, the processor filtering the plurality of first electrical signals so as to produce a plurality of filtered electrical signals; and

a plurality of electronic coincidence circuits, the coincidence circuits detecting coincidences occurring between the plurality of filtered electrical signals and the plurality of second electrical signals.

As discussed above in relation to Claim 5, Applicant submits that Sawa does not disclose or suggest a system having “a particle detector array comprising a plurality of particle detectors,” as

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recited by Claim 1. Furthermore, Sawa does not disclose or suggest a system having “a target position which is a first distance from the material to be analyzed” combined with “the detector array at a second distance from the target position, the second distance being larger than the first distance,” as recited by Claim 1. Furthermore, these claim limitations are not disclosed in the portions of the present application identified by the Examiner as “admitted prior art.” Therefore, Applicant submits that Claim 1 is patentably distinguished over Sawa in view of the “admitted prior art” identified by the Examiner. Applicant respectfully requests that the Examiner withdraw the rejection of Claim 1 and pass Claim 1 to allowance.

**Claims 2-4**

Each of Claims 2-4 depends from Claim 1, so each of Claims 2-4 includes all the limitations of Claim 1, as well as other limitations of particular utility. Thus, Claims 2-4 are patentably distinguished over Sawa in view of the “admitted prior art” identified by the Examiner. Applicant respectfully requests that the Examiner withdraw the rejection of Claims 2-4 and pass these claims to allowance.

**Claim 13**

As discussed above in relation to Claim 5, neither Sawa nor the “admitted prior art” identified by the Examiner provides any disclosure regarding the relative sizes of the first and second distances. Claim 13 depends from Claim 5, so Claim 13 includes all the limitations of Claim 5, as well as other limitations of particular utility. Thus, Claim 13 is patentably distinguished over Sawa in view of the “admitted prior art” identified by the Examiner. Applicant respectfully requests that the Examiner withdraw the rejection of Claim 13 and pass Claim 13 to allowance.

**Summary**

For the foregoing reasons, Applicant submits that Claims 1-17 are in condition for allowance, and Applicant respectfully request such action.

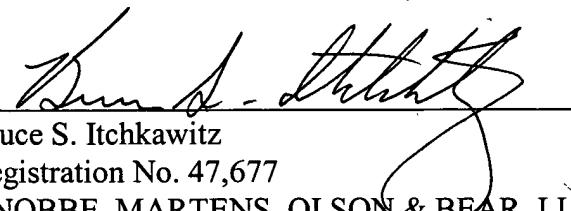
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Respectfully submitted,

Dated: 3/28/05

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